What is claimed:

1. A noise injection / loading circuit for use in noise loading an optical network, said noise injection / loading circuit comprising:

an optical noise injection / loading amplifier for applying noise to the optical network, said noise injection / loading amplifier configured to output at a fixed power level; and

an optical attenuator connected in series with the optical noise injection / loading amplifier for receiving the signals to be applied to the noise injection / loading amplifier and for attenuating the signal to adjust the signal to noise ratio of output from the noise injection / loading amplifier.

2. The circuit of claim 1 further comprising a second optical attenuator for adjusting power of the output for the noise injection / loading amplifier to an appropriate level for a receiver.

3. The circuit of claim 1 wherein the optical attenuator is tunable.

4. In an optical network, a method comprising the steps:

transmitting an optical test signal to the optical network;

attenuating channel power of the optical test signal;

adding noise to the optical test signal; and

calculating the BER based on the optical test signal received at the receiver.

5. The method of claim 4 wherein the noise is created by a one-stage noise-loading amplifier.

6. The method of claim 4 wherein the amplifier is operated at constant output power.

7. The method as recited in claim 4 the attenuating is done to establish a given optical signal noise ratio.

8. A system, comprising:

an optical network;

a transmitter for applying a test signal to the optical network for testing the optical network; and

a noise injection / loading circuit, comprising:

an optical noise injection / loading amplifier for applying noise to the optical network, said noise injection / loading amplifier configured to output at a fixed power level; and

an optical attenuator connected in series with the optical noise injection / loading amplifier for receiving the signals to be applied to the noise injection / loading amplifier and for attenuating the signal to adjust the signal to noise ratio of output from the noise injection / loading amplifier.

9. The system of claim 8 further comprising a receiver for receiving output from the noise injection / loading circuit.

10. The system of claim 9 further comprising a Bit Error Rate Tester (BERT) for measuring BER of output received at the receiver.

11. The system of claim 10 wherein the BERT has a module in communication with the transmitter and a module in communication with the receiver.

12. The system of claim 9 wherein the noise injection / loading circuit is positioned between the optical network and the receiver.

13. The system of claim 9 wherein the noise injection / loading circuit includes a second optical attenuator for adjusting output from the optical noise loading amplifier to an appropriate power level for the receiver.

14. The system of claim 8 wherein the optical attenuator is tunable.

15. In an optical network, a method of testing the optical network, comprising:

providing a noise injection / loading circuit in the optical network, wherein said noise injection / loading circuit includes an optical noise injection / loading amplifier for adding noise and an optical attenuator for attenuating input signal power of input to the optical noise injection / loading amplifier;

configuring the noise injection / loading optical amplifier to be in constant output power mode;

setting the optical attenuator to a first level of attenuation;

applying a first test signal to the optical network;

calculating a first measurement of a performance metric for the optical network;

setting the optical attenuator to a second level of attenuation; and

calculating a second measurement of a performance metric for the optical network.

16. The method of claim 15 wherein the performance metric is Bit Error Ratio (BER).

17. The method of claim 15 wherein the optical attenuator is set to the first level of attenuation to achieve a first optical signal to noise (OSNR) ratio.

18. The method of claim 15 wherein the optical attenuator is set to the second level of attenuation to achieve a second optical signal to noise ratio (OSNR).

19. The method of claim 15 further comprising the step of composing the first measurement and the second measurement of the performance metric to determine if the optical network behaves as anticipated.

20. The method of claim 19 further comprising the step of attenuating output from the optical noise injection / loading amplifier.